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REVISED NOMENCLATURE FOR THE *SOLIDAGO SIMPLEX* COMPLEX (ASTERACEAE: ASTEREAE)

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ABSTRACT

The *Solidago simplex* complex is here divided into six species. The following new combination in proposed: *Solidago ontarioensis* (Ringius) Semple & Peirson

KEY WORDS: *Solidago simplex*, *Solidago* subsect. *Humiles*, *Solidago chlorolepis*, *Solidago gillmanii*, *Solidago ontarioensis*, *Solidago racemosa*, *Solidago randii*

In the Flora of North America treatment of *Solidago* (Semple & Cook 2006), the *Solidago simplex* Kunth treatment followed the circumscription of the group by Gordon Ringius (Ringius 1985, 1987a, 1987b; Ringius & Semple 1991). The species was divided into seven varieties grouped into two subspecies. This followed the earlier work on the complex by Arthur Cronquist, who preferred lumping multiple taxa into a single, variable species [first as *S. glutinosa* Nutt. (Cronquist 1947) and subsequently as *S. spathulata* DC. (Cronquist 1955)]. Peirson et al. (2012) presented a review of the cytogeography of *Solidago* subsect. *Humiles* (Rydb.) Semple and a discussion of species concepts and their application to the *S. simplex* complex, and a phylogeographic study by Peirson et al. (in press) showed that polyploid *S. simplex* subsp. *randii* and its four varieties were likely not a single lineage.

Semple (2013, Astereae Lab web site) presented a revised classification of *Solidago* that included splitting the genus into more species by recognizing some placed into synonymy previously or by raising subspecies or varieties to species level. This paper presents the nomenclature of the *S. simplex* complex following similar changes in conceptual thinking about other taxa in *Solidago*. Peirson et al. (2012) and Peirson et al. (in press) noted that additional study is needed to further understand possibly multiple separate origins of northern and southern populations within *S. ontarioensis* and *S. racemosa*. This paper does not resolve those problems, but it does provide species level nomenclature for the complex overall. Most species level names have already been proposed.

Solidago simplex Kunth, Nov. Gen. 103. 1818. **TYPE**: **MEXICO**. (holotype: P, digital image! <http://plants.jstor.org/specimen/p00320045?s=t>).

Solidago stricta Hook., Fl. Boreali-Amer. 2: 4: 1834; non Ait. (1763), nec Moench (1802), nec Less. (1831). **SYNTYPES**: **CANADA**. Lake Huron, *Dr. Todd.* "Woody country between lat. 54 and 64 , *Dr. Richardson.* "Carlton House on the Saskatchawan," *Drummond s.n.* [Inclusion here is based on Fernald 1936].

Solidago confertiflora DC., Prodr. 5: 339. 1836; non Nutt. (1836), non Fisch. & Mey. (1841). *Solidago virgaurea* L. var. *confertiflora* (DC.) Kurtz, Engl. Bot. Jahrb. 19: 386. 1894. **TYPE**:

CANADA. British Columbia. "Nootka" Sound on Vancouver Is., *Haenke s.n.* (holotype: G-DC! [resinous all over]).

Solidago glutinosa Nutt., Trans. Amer. Phil. Soc. n.s. 7: 328. 1841. *Solidago glutinosa* var. *glutinosa* Cronq., Rhodora, 49: 76. 1947. *Solidago spathulata* ssp. *glutinosa* (Nutt.) Keck, Aliso 4: 104. 1958. **LECTOTYPE** (Ringius, Taxon 35: 155. 1987): **USA**. "On the Oregon and Wahlemet rivers," *Nuttall s.n.* (BM!; isolectotype: PH!).

Solidago multiradiata Ait. var. *neomexicana* A. Gray, Proc. Amer. Acad. 17: 191. 1882. *Solidago neomexicana (A. Gray)* Woot. & Standl., Contrib. U.S. Nat. Herb. 16: 182. 1913. *Solidago spathulata* var. *neomexicana* (A. Gray) Cronq., Univ. Wash. Publ. Biol 17: 311. 1955. *Solidago spathulata* var. *neomexicana* (A. Gray) Cronq., Vasc. Pls. Pacif. Northw. 5: 311. 1955. **TYPE**: **USA. New Mexico**. Mogollon Mts, high rocky summits, 7 Sep 1881, *Rusby 228 1/2* (holotype: GH!; isotype: US online image!).

Aster bonplandii O. Ktze., Rev. Gen. 1: 315. 1891. Based on *Solidago simplex* Kunth (1818).

Aster confertiflorus O. Ktze., Rev. Gen. 1: 317. 1891. Based on *Solidago confertiflora* DC. (1836).

Solidago decumbens E.L. Greene, Pittonia 3: 161. 1897. **LECTOTYPE** (Ringius, Taxon 36: 157. 1987): **USA. Colorado**. Alpine summit of Little Ouray Mt., 3 Sep 1896, *Greene s.n.* (ND-G!). Remaining syntypes: **Colorado**. Marshall Pass, 5 Sep 1896, *Greene s.n.* (ND-G 054069!, ND-G 054082!. *Osterhout s.n.*, NY).

Solidago oreophila Rydb., Mem. N.Y. Bot. Gard. 1: 387. 1900. *Solidago decumbens* var. *oreophila* (Rydb.) Fern., Rhodora 38: 202. 1936. **LECTOTYPE** (Fernald 1936): **CANADA. Saskatchewan**. Carlton House, *Drummond s.n.* (BM?, not seen).

Solidago aureola Greene, Pittonia 4: 236. 1901. **TYPE**: **USA. New Mexico**. El Capitan Mountains, in pine belt, at about 8000 ft, 28 Jul 1900, *E.S. Earle s.n.* (holotype: ND-G!, isotype: NY photo! *E.S. Earle & Earle 467*).

Solidago yukonensis Gandoger, Bull. Soc. Bot. France 50: 214. 1903. **TYPE**: **CANADA. Yukon Territory**. [given as **Alaska**.] Fifty-Mile River, "in glareosis subherbosis frigidis," 3 Aug 1899, *A.L. Bolton s.n.* (holotype: LY?; isotype: US, online image!).

Solidago humilis f. *crandallii*, M. Gandoger, Bull. Soc. Bot. France 50:215. 1903. **LECTOTYPE** (designated here): **USA. Colorado**. Beaver Creek, in declivius frigidis, alt. 11,000 ft, *Crandall 3152* (US online image!). Additional syntypes: **Wyoming**. "In elatioribus supra Laramie" *Nelson* (not seen). **California**. "In sierra Nevada supra Reno et ad nives versus lacum Webber, *B. Kennedy & Doten* (not seen).

Solidago humilis f. *pattersonii* Gandoger, Bull. Soc. Bot. France 50: 215. 1903. **TYPE**: **USA. Colorado**. "In saxosis ad Clear Creek, Empire, alt. 8500 ped.," *H.N. Patterson Colorado fl. exs. n. 275* (holotype: not seen; isotype: US online image!).

Solidago vespertina Piper in Piper & Beattie, Fl. Northw. Coast. 365. 1915. **LECTOTYPE** (Ringius, Taxon 36: 157. 1987): **USA. Washington**. Mason Co.: near Union City, open pine woods, 22 Jul 1890, *Piper 886* (WS 29450!; isolectotypes: UC!, WTU!). Remaining syntype: Tacoma, *Flett. Piper 886,* 4 Jul 1890 (GH!) not a type.

Solidago simplex Kunth **var. *nana*** (A. Gray) Ringius in Ringius & Semple, Phytologia 70: 397. 1991. *Solidago humilis* Pursh var. *nana* A. Gray, Syn. Fl. N. Amer. 1, pt, 2: 148. 1884. *Solidago purshii* Porter var. *nana* (A. Gray) Farwell, Amer. Midl. Nat. 12: 72. 1930. *Solidago glutinosa* Nutt. var. *nana* (A. Gray) Cronq., Rhodora, 49: 76. 1947. *Solidago spathulata* DC. var. *nana* (A. Gray) Cronq., Vasc. Pls. Pacif. Northw. 5: 311. 1955. **LECTOTYPE**: (Ringius, Taxon 36: 155. 1987): **USA. Washington**. Mt. Adams, high up, 1882, *Howell s.n.* (GH!). Remaining syntypes: **Colorado**. *Parry 18* (GH!). **Oregon**. 1871, *Hall 258* (NY-2!, GH!; all = var. *simplex*). **Washington**. Mt. Adams, *Suksdorf s.n.* (GH-2!, NY!).

Solidago bellidifolia Greene, Pittonia 4: 100. 1899. **TYPE: USA. Washington**. Mount Adams, 8 Aug 1882, *T.J. Howell s.n.* (holotype: ORE!; isotype: NY, photo!).
Solidago hesperia Howell, Fl. N. W. Amer. 1: 303. 1900. Based on *S. humilis* var. *nana* Gray.

Solidago chlorolepis Fern., Rhodora 17: 3. 1915. *Solidago decumbens* var. *chlorolepis* (Fern.) Beaudry, Nat. Canad. 91: 194. 1964. *Solidago glutinosa* var. *chlorolepis* (Fern.) Ringius, Taxon 36: 157. 1987. *Solidago simplex* Kunth var. *chlorolepis* (Fern.) Ringius in Ringius & Semple, Phytologia 70: 397. 1991. **TYPE: CANADA. Quebec**. Mt. Albert, gulch north of Lac au Diable, and crevices and talus of serpentine, *Collins & Fernald 750* (holotype: GH!).

Solidago gillmani (A. Gray) Steele, Contrib. U.S. Nat. Herb. 13: 367. 1911. *Solidago humilis* Pursh var. *gillmani* A. Gray Proc. Amer. Acad. 17: 191. 1882. *Solidago racemosa* var. *gillmanii* (A. Gray) Fern., Rhodora 10: 91. 1908. *Solidago virgaurea* L. var. *gillmanii* (A. Gray) Porter, Bull. Torrey Bot. Club 20: 290. 1893. *Solidago purshii* Pursh var. *gillmanii* (Gray) Farwell, Amer. Midl. Nat. 12: 73. 1930. *Solidago glutinosa* Nutt. var. *gillmani* (A. Gray) Cronq., Rhodora 49: 77. 1947. *Solidago spathulata* var. *gillmani* (A. Gray) Gleason, Phytologia, 4: 25. 1952. *Solidago simplex* Kunth var. *gillmanii* (A. Gray) Ringius in Ringius & Semple, Phytologia 70: 397. 1991. **LECTOTYPE** (Ringius, Taxon 36: 155. 1987): **Michigan**. S shore of Lake Superior, 1879, *Boott s.n.* (GH!). Remaining syntypes: **Michigan**. S shore of Lake Superior, 1875, *Boott s.n* (GH!, NY!); St. Joseph, 10 Oct 1872, *Gillman 3* (GH!, NY!); "On sand hillocks on the shores of Lakes Superior and Michigan." Ringius (1987) discussed other possible syntypes. Orthographic variants: *gillmani, gilmanii.*
Solidago virgaurea L. var. *gilmanii* Porter, Bull. Torrey Bot. Club 20: 209. 1893, orthographic variant.
Solidago deamii Fern., Rhodora 38: 204, tab. 418, figs 1-3. 1936. **TYPE: USA. Indiana**. Porter Co.: in a blow out at end of Section Line Road 2 mi E of Tremont, 14 Sep 1923, *Deam 39707* (holotype: GH!).

Solidago ontarioensis (Ringius) Semple & Peirson, comb. et stat. nov. *Solidago glutinosa* var. *ontarioensis* Ringius, Phytologia 62: 432. 1987. *Solidago simplex* Kunth var. *ontarioensis* (Ringius) Ringius in Ringius & Semple, Phytologia 70: 398. 1991. **TYPE: CANADA. Ontario**. Algoma Dist.: Michipigoten Harbour, coastal rocks, 25 Aug 1984, *Ringius 1987* (holotype: WAT!).

Solidago randii (Porter) Britton. Man. 937. 1901. *Solidago virgaurea* L. var. *randii* Porter, Bull. Torrey Bot. 20: 208. 1893. *Solidago glutinosa* Nutt. var. *randii* (Porter) Cronq., Rhodora 49: 77. 1947. *Solidago spathulata subsp. randii (Porter) Gleason,* Phytologia 4: 25. 1952. *Solidago simplex Kunth* subsp. *randii* (Porter) Ringius in Ringius & Semple, Phytologia 70: 397. 1991. **LECTOTYPE** (Ringius, Taxon 36: 156. 1987): **USA. Maine**, Mt. Desert Is., Great Cranberry Is., Spurling Point, 30 Aug 1892, *E.L. Rand s.n.* (NY ex Herb. Columbia Col.! — has Porter's handwritten label; isolectotypes: DAO!, NY!). Remaining syntype: **Vermont**. "shores of Lake Champlain, *Pringle s.n.* (GH!, NY-2!, PH!).
Solidago puberula Nutt. var. *monticola* Porter, Bull. Torrey Bot. Club 19: 129. 1892. *Solidago randii* var. *monticola* (Porter) Fern., Rhodora 10: 88. 1908. *Solidago simplex* Kunth var. *monticola* (Porter) Ringius in Ringius & Semple, Phytologia 70: 397. 1991. **LECTOTYPE** (Ringius, Taxon 36: 156. 1987): **USA. Maine**. Mt. Kineo, Moosehead Lake, 28 Aug 1871, *Porter s.n.* (PH ex Herb. Porter!). Remaining syntypes: **Maine**: Mount Desert Is., Dog Mount, *Rand* (NY!). **New Hampshire**. Mt. Monadnock, *Deane (NY*!; PH(2)!, online digital images!).
Solidago virgaurea var. *deanei Porter*, Mem. Torrey Bot. Club 5: 320. 1894. nom. nov. for *Solidago puberula* var. *monticola* Porter. nom. superfl.

Solidago virgaurea var. *redfieldii* Porter, Bull. Torrey Bot. Club 20: 209. 1893. **LECTOTYPE** (Ringius, Taxon 36: 156. 1987): **USA. New York**. Adirondack Mts, Summit Rock, Indian Pass, 2600 ft, 3 Sep 1892, *Britton* (PH 710173 ex Herb. Porter!). Remaining syntype: **Maine**. Mt. Desert Is., Frenchman Camp Rd., 1 Sep 1892, *Rand* (PH!), Western Mt., *Redfield* (PH!).

Solidago racemosa Greene, Pittonia, 3: 160. 1897. *Solidago purshii* var. *racemosa* Farwell, Amer. Midl. Nat. 11: 84. 1928. *Solidago glutinosa* var. *racemosa* (Greene) Cronq., Rhodora 49: 77. 1947. *Solidago spathulata* var. *racemosa* (Greene) Gleason Phytologia, 4: 25. 1952. *Solidago simplex* Kunth var. *racemosa* (Greene) Ringius in Ringius & Semple, Phytologia 70: 397. 1991. **LECTOTYPE** (Ringius, Taxon 36: 156. 1987): **USA. Maryland**. Great Falls of the Potomac River, near Broadwater, 18 Oct 1896, *D.L. Topping s.n.* (ND-G 054308!; isolectotype: NY!).

?*Solidago chrysolepis* Fern., Ottawa Nat. 19: 168. 1905. **TYPE**: **CANADA. Quebec**. "Gravel-beach of River Ste. Anne des Monts," 5 Aug 1905, *Collins & Fernald* (holotype: GH!).

Solidago racemosa Greene f. *leucantha* Fern., Rhodora 20: 172. 1918. **TYPE**: **USA. New Hampshire**. [Grafton Co.]: Bath, argillaceous ledges by the Connecticut River, with the typical orange-flowered form, 18 Aug 1917, *Fernald 15575* (holotype: GH!).

Solidago anticostensis Fern., Rhodora 29: 142. 1927. **TYPE**: **CANADA. Quebec**. Pointe Sud-ouest, falaises caillouteuses seches, 7 Aug 1926, *Victorin & Rolland 25158* (holotype: GH!).

Solidago victorinii Fern., Rhodora 29: 143. 1927. **TYPE**: **CANADA. Quebec**. Anticosti Is., Riviere Chicotte, corniches calcaires, 7 Aug 1926, *Victorin & Rolland 2509* (holotype: GH!).

Solidago × *raymondi* Rousseau, Can. J. Res. 28: 243. 1950. **TYPE**: **CANADA. Quebec**. Anticosti Is., Riviere Pavillon, sur les platiers et la berge graveleuse a l'embouchure, 17 Jul 1942, *Rousseau 52325* (holotype: MT). [Supposedly = *S. racemosa* × *S. victorinii*]

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LITERATURE CITED

Cronquist, A. 1947. Notes on the Compositae of the northeastern United States IV. *Solidago*. Rhodora 49: 69-79.

Cronquist, A. 1955. Vascular Plants of the Pacific Northwest. Part 5: Compositae. Univ. of Washington Press. Seattle.

Fernald, M.L. 1936. Contributions from the Gray Herbarium of Harvard University. No. CXIII. VI. Studies in *Solidago*. Rhodora 38: 209-228.

Peirson, J.A., A.A. Reznicek, and J.C. Semple. 2012. Polyploidy, speciation, and infraspecific cytotype variation in goldenrods: the cytogeography of *Solidago* subsection *Humiles* (Asteraceae: Astereae) in North America. Taxon: 61: 197-210.

Peirson, J.A., C.W. Dick, and A.A. Reznicek. In press. Phylogeography and polyploid evolution of North American goldenrods (*Solidago* subsect. *Humiles*, Asteraceae). J. Biogeogr.

Ringius, G.S. 1985. A biosystematic study of the *Solidago spathulata* DC. - *S. glutinosa* Nutt. complex (Compositae: Astereae). Ph.D. dissertation. Univ. of Waterloo, Waterloo, Ontario.

Ringius, G.S. 1987. *Solidago glutinosa* ssp. *randii* var. *ontarioensis* (Compositae: Astereae), a new upper Great Lakes endemic. Phytologia 62: 432.

Ringius, G.S. 1987. Lectotypifications and a new combination in the *Solidago spathulata* DC. - *S. glutinosa* Nutt. complex (Compositae: Astereae). Taxon 36: 154-157.

Ringius, G.S. and J.C. Semple. 1991. New combinations in *Solidago simplex* (Compositae: Astereae). Phytologia 70: 396-399.

Semple, J.C. 2013. Classification and Illustrations of Goldenrods. <https://uwaterloo.ca/astereae-lab/research/goldenrods/classification-and-illustrations>

Semple, J.C. and R.E. Cook. 2006. *Solidago* Linnaeus. Pp. 107–166, *in* Flora North America Editorial Committee (eds.). Flora of North America, Vol. 20. Asteraceae, Part 2. Astereae and Senecioneae. Oxford Univ. Press, New York.